

Critical Thinking – Thinking Differently



**Now where did I put
those car keys?**

Purpose of Higher Education

**“to help college students become
Intentional Learners who can adapt to new
environments, integrate knowledge from
different sources, and continue learning
throughout their lives.”**

AACU (2002)

Critical thinking is...

A form of judgment, specifically purposeful and reflective judgment. Using critical thinking one makes a decision or solves the problem of judging what to believe or what to do, but does so in a reflective way.

Critical thinking gives just consideration to:

- the evidence
- the context of judgment (circumstances, known facts)
- the relevant criteria for making that judgment well
- the applicable methods or techniques for forming that judgment
- the applicable theoretical constructs for understanding
- the nature of the problem and the question at hand.

Definitions of Critical Thinking

The definition of critical thinking has changed somewhat over the last decade:

**...the ability to analyze facts, generate and organize ideas, defend opinions, make comparisons, draw inferences, evaluate arguments and solve problems
(Chance,1986, p. 6)**

Chance, P. (1986). Thinking in the classroom: A survey of programs. New York: Teachers College, Columbia University.

Definitions of Critical Thinking

The definition of critical thinking has changed somewhat over the last decade:

...a way of reasoning that demands adequate support for one's beliefs and an unwillingness to be persuaded unless support is forthcoming (Tama, 1989, p. 64)

Tama, C. (1989). Critical thinking has a place in every classroom. Journal of Reading, 33, 64-65.

Definitions of Critical Thinking

The definition of critical thinking has changed somewhat over the last decade:

...a conscious and deliberate process which is used to interpret or evaluate information and experiences with a set of reflective attitudes and abilities that guide thoughtful beliefs and actions (Mertes,1991, p.24)

Mertes, L. (1991). Thinking and writing. Middle School Journal, 22, 24-25.

Definitions of Critical Thinking

The definition of critical thinking has changed somewhat over the last decade:

...the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action (Scriven & Paul, 1992)

Scriven, M., & Paul, R. (1992, November). Critical thinking defined. Handout given at Critical Thinking Conference, Atlanta, GA.

What it is not?

It is not about **thinking** negatively. Neither should it be confused with lateral **thinking**, which is about developing new insights and perspectives to solve a problem.

It is about ensuring that existing reasoning processes are followed tightly, and that the linkages are carefully scrutinized.

Critical Thinking (CT)

Works within the framework of scientific skepticism (when one questions the veracity of claims lacking empirical evidence)

The process of critical thinking involves acquiring information and evaluating it to reach a well-justified conclusion or answer.

Questions need to be asked:

1. Is the data/information accurate?
2. Is the source credible?
3. Is the data/information verifiable?
4. Can the logic/reasoning be tested?
5. Are the stated inferences/conclusions based on the findings?

Comparing Bloom's Taxonomy to Critical Thinking

Bloom's taxonomy of the cognitive domain:

- **Knowledge**
 - **Comprehension**
 - **Application**
 - **Analysis**
 - **Synthesis**
 - **Evaluation**
-

Levels of Understanding

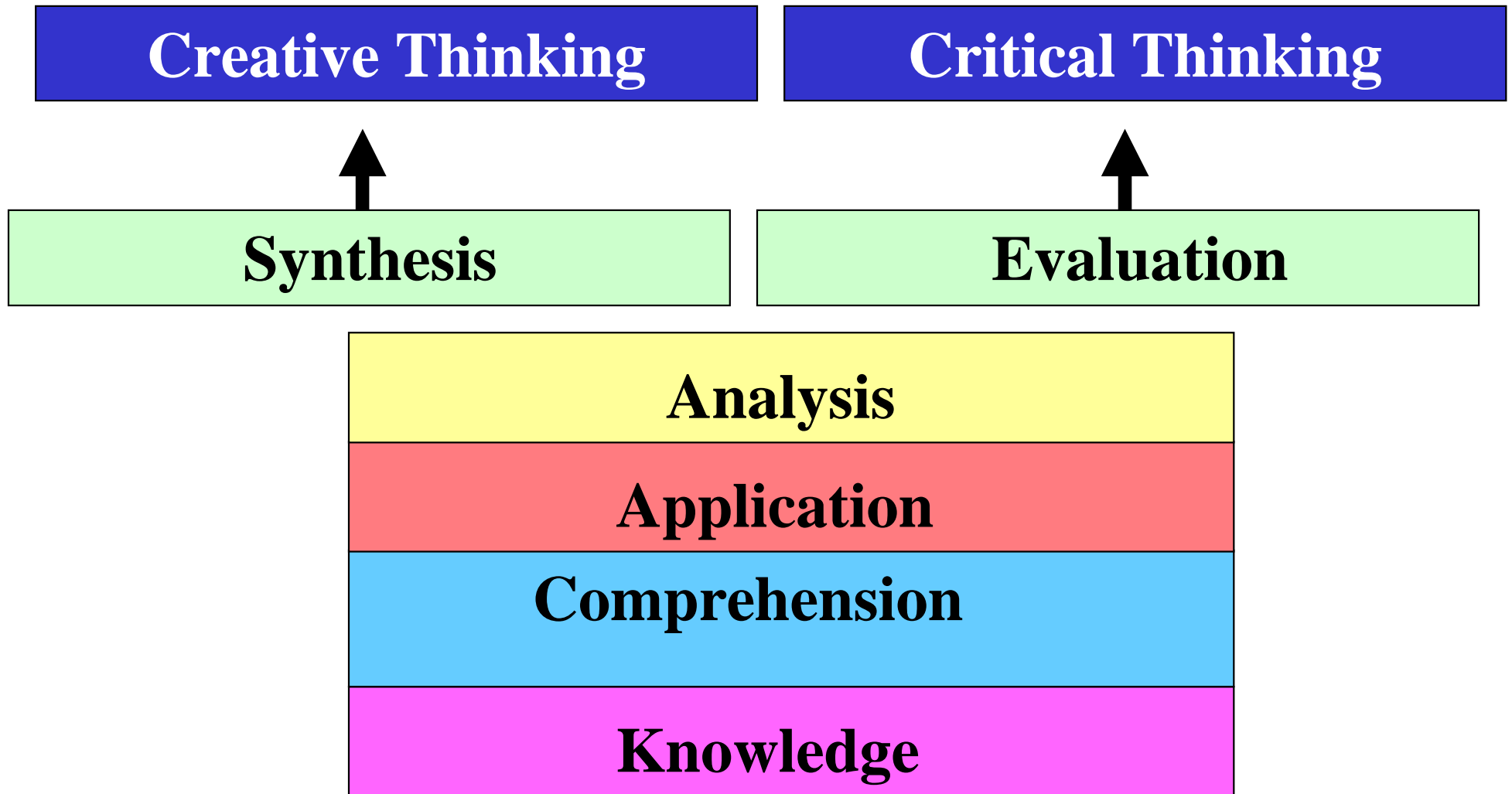
- Learning Beyond Memorization
- Bloom's Taxonomy (1956)



Bloom's Levels of Understanding

Level	Definition	Verb Examples That Can Represent Intellectual Activity
Evaluation	Appraise, assess, or critique on basis of standards or criteria	appraise, argue, assess, attach, choose, defend, estimate, judge, predict, rate, select, evaluate
Synthesis	Originate, integrate, or combine ideas into a new product or plan	arrange, assemble, compose, construct, create, design, develop, formulate, organize, propose
Analysis	Distinguish, classify, or relate assumption, hypotheses or evidence	analyze, appraise, categorize, compare, distinguish, examine
Application	Select, transfer, and use data or principles to complete new task	apply, choose, demonstrate, employ, illustrate, interpret, solve, use
Comprehension	Translate, comprehend, or interpret information	classify, describe, discuss, explain, indicate, restate, translate
Knowledge	Recall or recognition of information, ideas and principles	arrange, define, label, list, name, relate, recall, repeat, reproduce

Comparing Bloom's Taxonomy to Critical Thinking



Proposed Definition

Ennis' (1992) definition comes closest to useful generic definition

Proposed definition aligns with Bloom's level of evaluation

Critical thinking is the disciplined mental activity of evaluating arguments or propositions and making judgments that can guide the development of beliefs and taking action.

Comparing Bloom's Taxonomy to Critical Thinking

Huitt's (1992) classification of problem-solving techniques:

- **Critical thinking**--linear and serial, more structured, more rational and analytical, and more goal-oriented
 - **Creative thinking**--holistic and parallel, more emotional and intuitive, more creative, more visual, and more tactual/kinesthetic
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Comparing Bloom's Taxonomy to Critical Thinking

Springer & Deutsch's (1993) classification of brain-lateralization dominance:

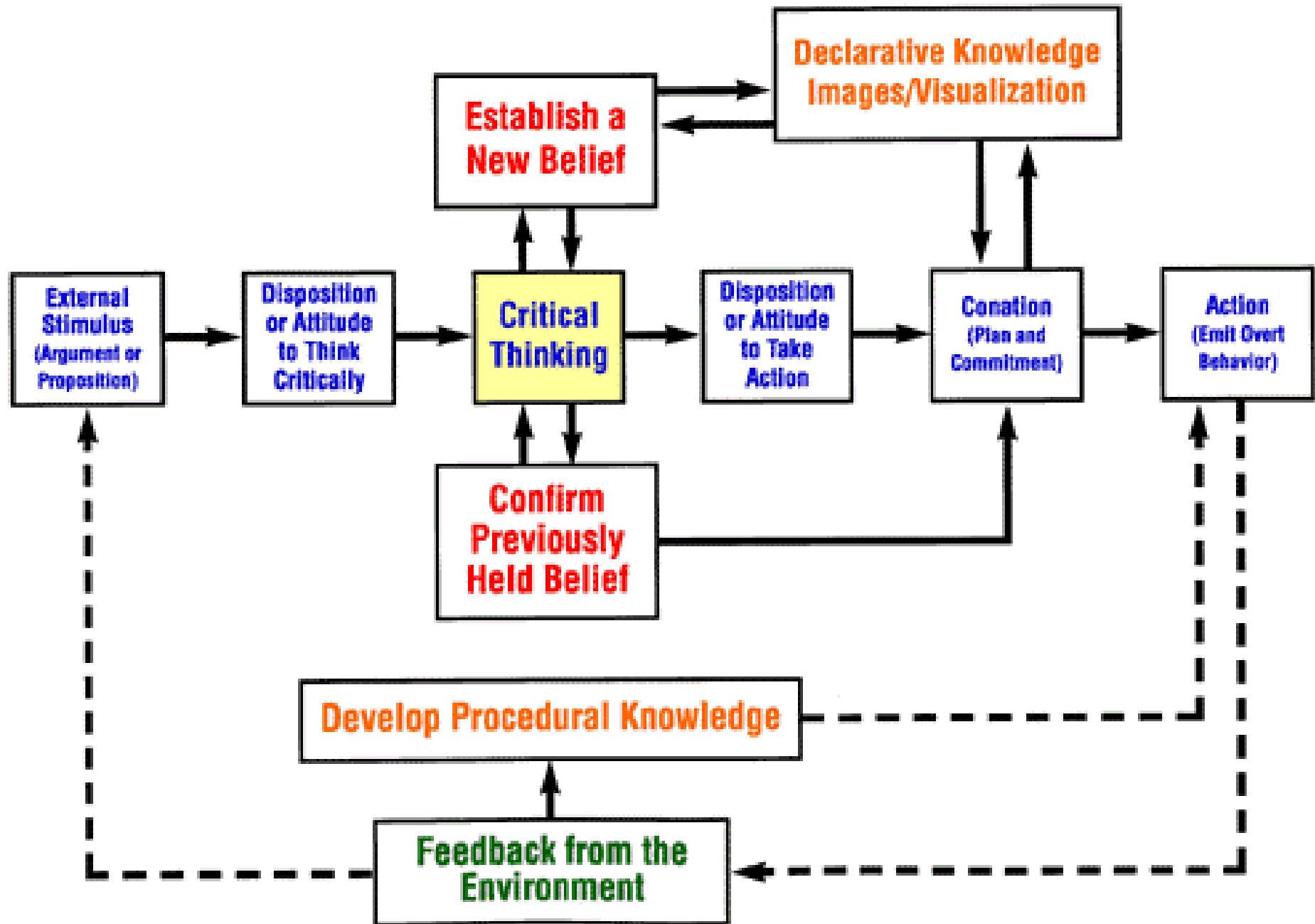
- **Left brain thinking**--analytic, serial, logical, objective
- **Right brain thinking**--global, parallel, emotional, subjective

Springer, S., & Deutsch, G. (1993). Left brain, right brain (4th ed.). New York: W. H. Freeman and Co.

Critical thinking must be contrasted with non-critical thinking:

- **Habitual thinking**
- **Brainstorming**
- **Creative thinking**
- **Prejudicial thinking**
- **Emotive thinking**

Model of Critical Thinking & Its Modification



Critical Thinking Program

A complete critical thinking model will include these components:

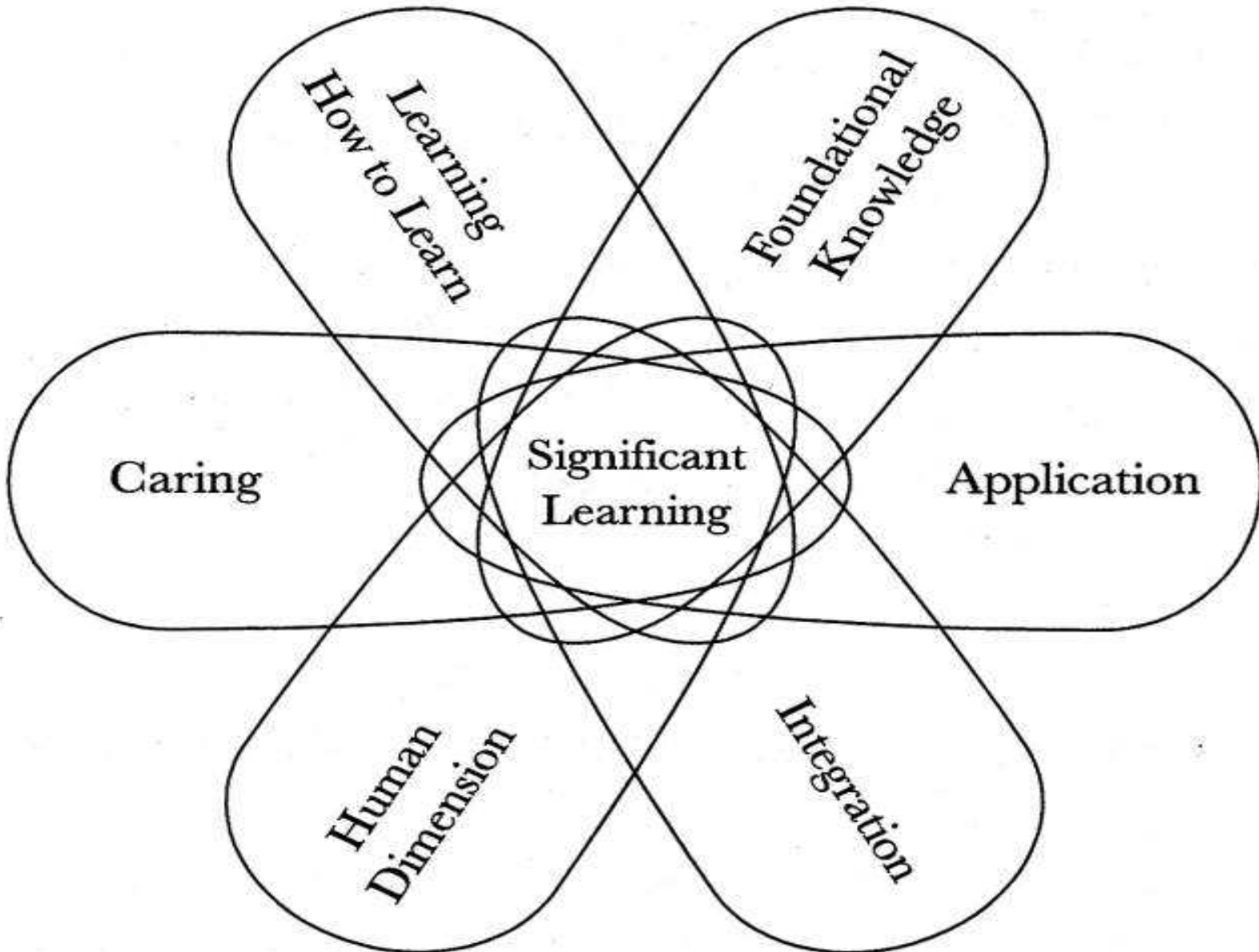
- **Declarative knowledge (We know that...)**
- **Procedural knowledge (performance of a task)**
- **Memory of images or visualizations**
- **Attitudes**
- **Process of critical thinking**
- **Conation (motivation/will/desire)**
- **Ineffective thinking practices**
- **Using feedback**

Intentional Learners

Becoming an intentional learner means: developing self-awareness about the reason for study, the learning process itself, and how education is used

Intentional learners are integrative thinkers who see connections in seemingly disparate information to inform their decisions.

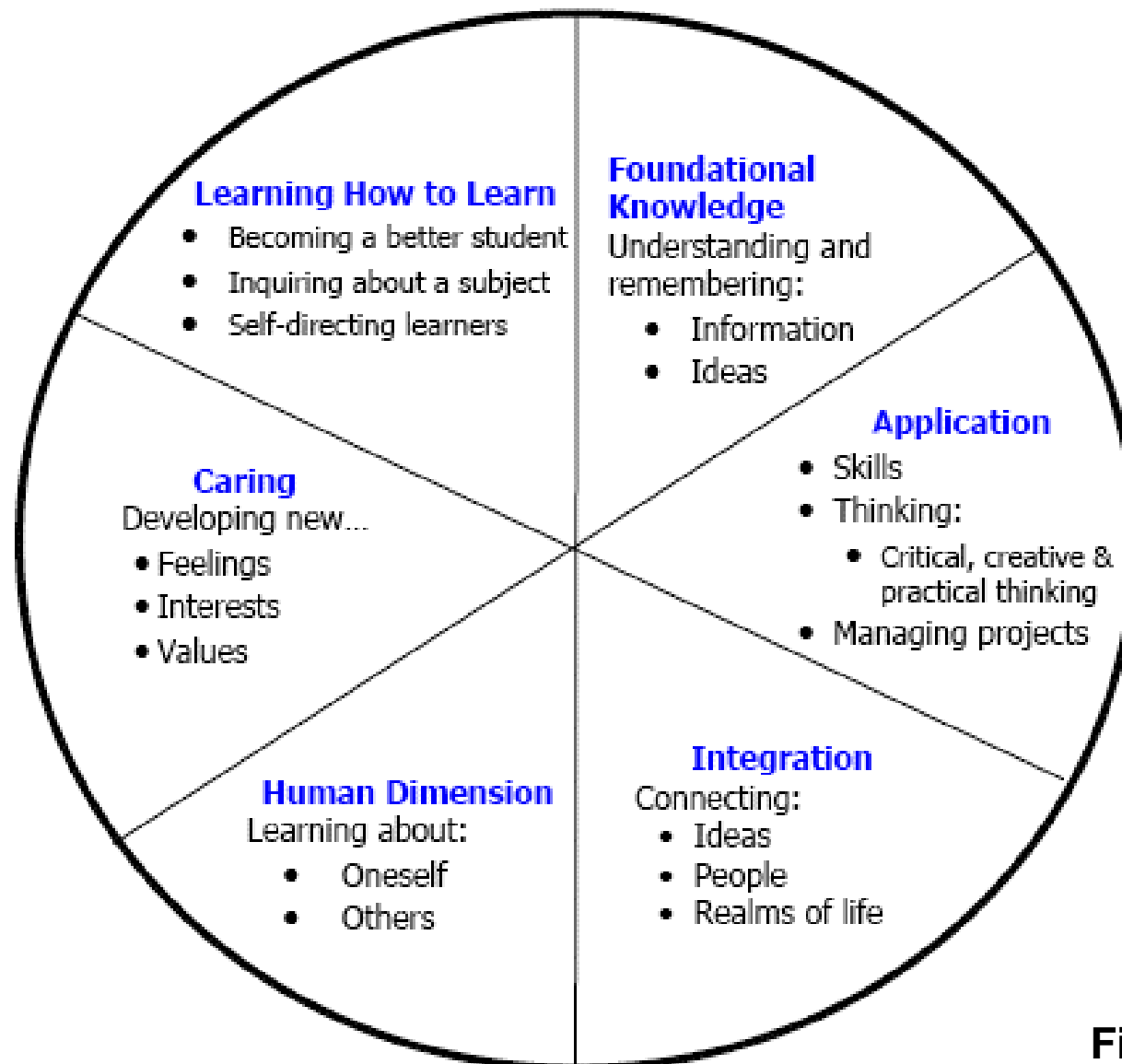
Significant Learning



Significant Learning

Learning that will be “significant to the learner”

THE TAXONOMY OF SIGNIFICANT LEARNING



Fink (2003)

Elements of Reasoning

Purpose & Motivation

Question or Problem

Assumptions

Point of View (lens/perspective)

Data, Information, Evidence

Concepts & Ideas

Inferences & Conclusions

Implications & Consequences

Metacognition

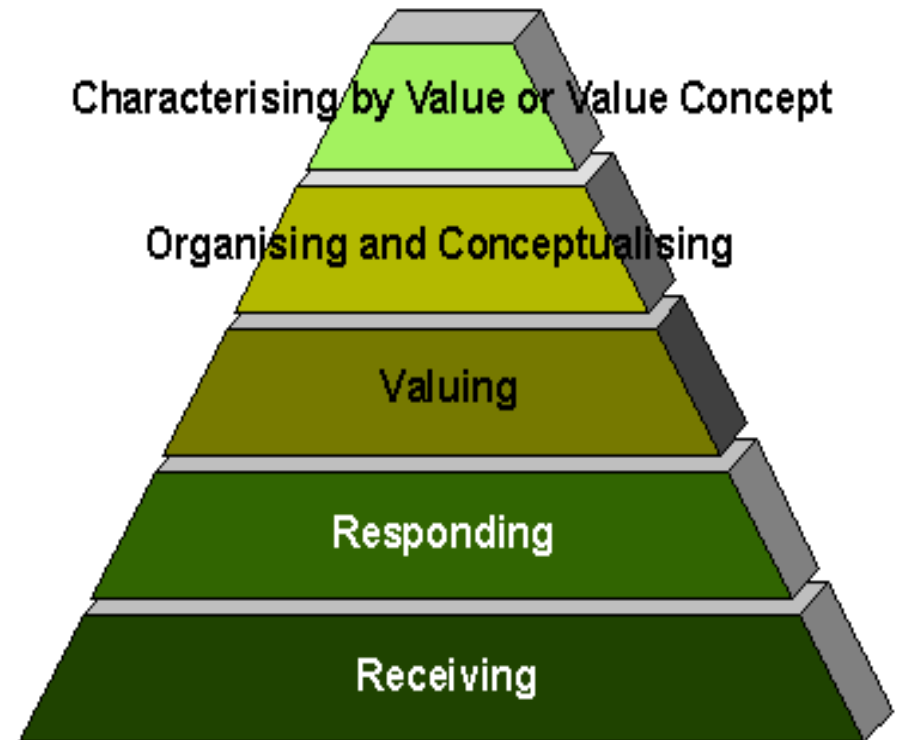
“Thinking about our thinking”

- Understanding how we Think
- What are our strategies for Learning
- How is our Thinking changing?
- How do we assess our Understanding
- How do we know if we are making progress on Learning Goals

Affective Domain Evidenced by...

- Attitudes
- Motivation
- Willingness to Participate
- Valuing What is Being Learned
- Incorporating Values Into Life

Affective domain



Intellectual Development

Perry's (1968) Study of Harvard Students

Positions of Intellectual Development; Four Sub-Categories

Stage I - Dualism

Either-Or thinking; Authorities have all the answers

Stage II - Multiplicity

Recognition of uncertainty; Everyone's opinions equally legitimate

Stage III - Relativism

Critical thinking; Knowledge is contextual and relativistic

Stage IV - Commitment to Knowing

Developing commitment and sense of being; Knowledge is the resolution between uncertainty and the need to act

Language in Critical Thinking.

We use words instinctively without giving real attention to their significance.

In **Critical Thinking**, these words are termed “**indicator words.**”

In meetings, interviews and presentations they shape listeners’ perceptions of what they hear.

Words such as “**therefore**”, “**so**”, “**consequently**”, “**thus**” and “**hence**” tell us that we are reaching a **conclusion**.

Others such as “**because**”, “**since**” and “**as**” tell us we are using **reasons**.

Finally, **but**” and “**however**” suggest that we are looking at a **counter argument**.

Types of flawed thinking.

Ad hominen: We attack the person in a debate rather than their **thinking**.

Appeal to pity: An appeal to sympathy to win an argument. “Don’t hit me I am wearing glasses.”

Appeal to authority: Trying to win a point by saying that someone in a powerful position authorizes it.

Insufficient evidence: Trying to draw a conclusion using a small sample.

Drawing a conclusion from one case: The car has failed the MOT on one item, so there is no point keeping the car.

Post hoc: Just because something has happened in the past does not mean it will occur again.

Slippery slope: An argument is taken through many stages and each may be weak. The cumulative impact is that one is rushed through a line of **thinking** which may be suspect.

Confusing causes and consequences: “Tall people have big feet, so growing taller means you will get bigger feet.”

Straw-man thinking: In answering a question you select a weak part of it, attack that, and ignore the main substance of the question which may be more difficult to answer.

The Politician’s answer: When faced with a difficult question, you pose another which is easier to answer .

Three Core Thinking Principles — Truthseeking, Fallibility, and Bias

Three principles underlie a solid critical thinking process:

Truthseeking (ensuring accuracy-driven decision-making)

Fallibility (remembering that any conclusion can be wrong
– there is no 100% certainty or confidence)

Bias (recognizing that all players in a decision process bring conscious and unconscious preferences with them).

Does a Possibly Make a Probably?

Difference between *Possible* and *Probable*

All of us can confuse these important ideas: (1) what is **impossible**, (2) what is **possible**, and (3) what is **probable**. Let's explain the difference.

1. Something is *impossible* if there is **no way that it could be true**.
2. Something is *possible* if there is **a chance that it could be true**.
3. Something is *probable* if it is **more likely true than not true**.
We must weigh the evidence and decide.

If someone chooses to believe a possibility while **ignoring evidence that supports an obvious probability**, they are using the *possibility fallacy* .

Avoiding Groupthink — the Critical Role of Dissent in Organizations

Should organizations enforce conformity and encourage **“yes” men and women** in their ranks?

Not if they want to survive and thrive, says Harvard’s Cass Sunstein.

From boardrooms to social movements to governments to the conduct of war, dissent has proven again and again to be the lifeblood of organizational strength.

When conformity is prized and dissent suppressed, organizations and initiatives tend to fail, often spectacularly.

When dissent is fostered and critical thinking encouraged, success most often follows.

Rapid Cognition and Thin-Slicing

The mind: conscious and deliberative or subconscious and intuitive

What takes place in the first moments we meet another person, hear an idea, or confront a challenge. We can achieve great insights in those opening moments – or commit catastrophic errors. The difference is in understanding **the principle of “thin-slicing”** – using small slices of experience to make important decisions.

Storming the Silos of Expertise

To gain access to the knowledge in a field outside of your own, you must rely on the experts. The task for the modern critical thinker is **distinguishing between the genuine experts and the counterfeits.**

Humor and Critical Thinking

There is mounting historical evidence that humor can play a vital role in critical thinking, **putting problems in a new light, reducing conflict, and establishing common ground.**

Humor is a facilitator of cultural and intellectual progress through humorists as divergent as Mark Twain, Kurt Vonnegut, and Jon Stewart.

Getting a Grip on Slippery Statistics

Far more people die each year while sleeping than while bungee jumping – so for safety’s sake, get out of bed and head for the nearest bridge!

Crafty stat-twisters can generate fear, excitement, votes, or buying frenzies by telling the **“truth” in an utterly deceptive way.**

Statistical deception, includes: overstated accuracy, fudged averages, skewed reporting samples, inaccurate comparisons, opportunistic percentages, false inferences, undefined terms, and uncontrolled variables.

Survey Techniques — Good, Bad and Ugly

Surveys are a staple of modern life. **Knowing that X percent of Americans believe, love, or buy** something has a powerful effect on the rest of us.

Politicians and marketers alike exploit the power of the popular consensus by constructing **surveys that give the impression of popular support** for their cause or product.

But is the support real – or manufactured by a slippery survey?

“The ability to think critically involves three things:

- (1) an attitude of **being disposed to consider in a thoughtful** way the problems and subjects that come within the range of one's experiences.
- (2) **knowledge** of the methods of logical inquiry and reasoning.
- (3) some skill in **applying** those methods

CT Musts - A Thinker must have the ability to:

- examine any belief or supposed form of knowledge
- recognize problems and to find workable means for meeting those problems
- gather pertinent information
- recognize unstated assumptions and values
- comprehend and use language with accuracy and clarity
- interpret data, to appraise evidence and evaluate arguments
- recognize the existence (or non-existence) of logical relationships between propositions
- put to test the stated conclusions and generalizations
- reconstruct one's patterns of beliefs on the basis of wider experience
- render accurate judgments about specific things and qualities

Irrespective of the sphere of thought, **“a well cultivated critical thinker”**:

1. raises vital questions and problems, formulating them clearly and precisely;
2. gathers and assesses relevant information, using abstract ideas to interpret it effectively
3. comes to well-reasoned conclusions and solutions, testing them against relevant criteria and standards;
4. thinks open-mindedly within alternative systems of thought, recognizing and assessing, as need be, their assumptions, implications, and practical consequences; and
5. communicates effectively with others in figuring out solutions to complex problems.

**Trying to get people to reason
in a way that is not natural for
them is like trying to teach a pig
to sing. You don't accomplish
anything and you annoy the
pig.**

--- E. Jeffrey Conklin & William Weil